

Quarterly Newsletter

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Cash Flow Problems and Resource Intermingling: Do They Affect Small Business Recovery and Resilience in the Wake of a Natural Disaster?

Renee Wiatt, Yoon Lee, Maria Marshall, and Virginia S. Zuiker

In small and family businesses, the family system and the business system often overlap and share resources, such as time and money. When there is a business or family disruption, it would seem logical and obvious to look to the other system for resources, such as money. Financial intermingling can expose the family or the business to vulnerabilities. Disruptions such as a natural disaster or a recession would pose greater threats to businesses who were already experiencing cash flow problems. We examined cash flow problems and financial intermingling between family and business following a natural disaster. The goal of this study was to determine what effects, if any, cash flow problems and financial intermingling have on business recovery and resilience following a natural disaster.

We surveyed business owners who had an operational business in 2004 in the lower 10 counties of Mississippi to examine how resilience

was influenced by a number of important variables including pre-Katrina cash flow, financial intermingling of family and business, among other business and owner characteristics. The businesses in this survey endured Hurricane Katrina and the effects of that disaster were measured. In order to measure recovery, operational status was observed for each business. For this study, businesses were classified as open if they were currently operating with the same owner or if the business reopened after Katrina, even though it was not currently operating. Businesses were classified as closed if the business was closed by Hurricane Katrina. Resilience was measured by comparing the business owner’s perception of business’ success before and after Hurricane Katrina. For open businesses, resilience is classified into three categories: survived (the business is less successful post-Katrina), recovered (the business has the same level of perceived success pre- and post-Katrina), or resilient (higher levels of success post-Katrina).

Our study found that recovery and resilience are affected in different ways by cash flow problems and financial intermingling of the business and the household. Cash flow problems and financial intermingling did not affect short-term business survival following Katrina. The largest factor that affected short-term recovery following Hurricane Katrina was the level of storm damage. Businesses with major damage were 10% less likely to continue operation following the hurricane. However, cash flow problems and financial intermingling had a large effect on long-term resilience.

Of those businesses that survived Katrina, only 16% had cash flow problems before the disaster. After Katrina, however, 82% of survived businesses, 57% of recovered businesses, and 68% of resilient businesses had cash flow problems. Businesses with cash flow problems following Hurricane Katrina were 6% more likely to have less success following Katrina, 3% less likely to have the same amount of success pre- and post-Katrina, and 2% less likely to be better off following the storm.

There was only a 1% difference between businesses that did and did not survive Katrina in terms of financial intermingling, with 88% of survived businesses participating and 89% of

demised businesses participating. Businesses that intermingled household and business finances to fund the business were 11% more likely to have less success following Katrina, 7% less likely to have the same amount of success pre- and post-Katrina, and 4% less likely to be better off after the hurricane.

Disasters and disruptions will continue to occur and affect small and family businesses. The flow of resources from the family to the business and vice versa in such operations will undoubtedly continue. Even during the recent COVID-19 pandemic, most small and family businesses probably faced the dilemma of taking resources from the family to fund the business, or vice versa. However, our research showed that financial intermingling lessened the likelihood of long-term business resilience. It is important for these small and family businesses to understand how cash flow issues and financial intermingling can affect recovery, specifically long-term resilience.

To read the research article published in the Journal of Family and Economic Issues, visit the following page: <https://doi.org/10.1007/s10834-020-09710-y>.

How Much Debt Can a Farm Carry?

Michael Langemeier

Introduction

Using FINBIN data (Center for Farm Financial Management, 2020), the average debt to asset ratio in 2007, the start of the ethanol boom, was 0.44. The bottom quartile had debt to asset ratios above 0.65. The top quartile had debt to asset ratios below 0.26. Due to strong earnings from 2007 to 2013, the average debt to asset ratio improved to 0.35 in 2013, the latest peak in terms of U.S. net farm income. By 2019, after several years of earnings below the 2007 to 2013 average, the debt to asset ratio averaged 0.42. The bottom and top quartiles had debt to ratios above 0.68 and below 0.24, respectively, in 2019. Obviously, there are large differences in leverage among farms.

Given the wide variability in debt to asset ratios among farms, it is natural to think about how much debt a particular farm can carry. Although this question is too general for a specific response, some guidelines can be provided for certain debts where repayment terms are known. Important factors to be considered when estimating the amount of debt that can be repaid and the amount of debt that a farm is comfortable with include current liquidity and solvency positions, repayment capacity, length of repayment period and interest rate, stability of income, skill and experience of each operator, age and health of operators, and an operator's risk aversion level.

A case farm in west central Indiana is used to

illustrate liquidity, solvency, and repayment capacity in the discussion below. This case farm utilizes a corn/soybean rotation and operates 3000 acres, 750 of which is owned.

Current Liquidity and Solvency Positions

Farms with solid liquidity and solvency positions have more flexibility regarding increases in debt levels. A farm with a solid liquidity position has sufficient current assets to cover current liabilities as well as a potential increase in current liabilities. A farm with a solid solvency position has sufficient current and noncurrent assets to cover current debt obligations as well as potential increases in debt levels.

The case farm had a current ratio of 5.57 and a solvency ratio of 0.143 at the end of 2019. In general,

a current ratio above 2.0 and a solvency ratio below 0.30 are indicative of strong financial positions. Thus, the case farm has strong liquidity and solvency positions.

Repayment Capacity

Repayment capacity measures include capital debt repayment capacity, capital debt repayment margin, and replacement margin. Capital debt repayment capacity and capital debt repayment margin address a farm's ability to repay operating loans and to cover the current portion of principal and interest due on noncurrent loans such as a machinery, building, or land loan. The replacement margin enables borrowers and lenders to evaluate whether a farm has sufficient funds to repay term debt and replace assets. For a farm to grow, it is essential that the

Table 1. Repayment Capacity Measures for White County Farms, 2020

Capital Debt Repayment Capacity and Margin, and Replacement Margin

Accrual Net Farm Income	1	\$139,074
Off-Farm Income	2	0
Income and Self-Employment Taxes	3	0
Interest Expense on Term Debt	4	63,148
Depreciation	5	175,292
Family Living Expenses	6	85,000
Capital Debt Repayment Capacity $\{(1+2-3+4+5)-6\}$	7	\$292,514
Principal on Term Debts and Capital Leases	8	52,373
Unpaid Operating Debt from Prior Period	9	0
Capital Debt Repayment Margin $\{7 - (4+8+9)\}$	10	\$176,993
Cash Used for Capital Replacement	11	201,586
Replacement Margin $\{10-11\}$	12	-\$24,593
<i>Term Debt and Capital Lease Coverage Ratio $\{7 / (4+8+9)\}$</i>	13	253.2%
<i>Replacement Margin Coverage Ratio $\{7 / (4+8+9+11)\}$</i>	14	92.2%



replacement margin be large enough to repay term debt, replace assets, and purchase new assets. For this to occur, the long-run average replacement margin has to be positive. Langemeier (2019) further discusses the relationship between repayment capacity and farm growth potential.

Repayment capacity projections for the case farm in 2020 can be found in table 1. The projections of accrual net farm income use trend yields and futures prices for this fall and winter adjusted for basis. It

appears that the case farm will be able to cover term debt payments, but the negative replacement margin indicates that the farm will have difficulty replacing capital assets. The cash used for capital replacement was estimated by multiplying depreciation by 1.15. This computation assumes that over the long-run the farm is interested in replacing machinery as it wears out and needs an additional margin for farm growth.

Figure 1 (next page) illustrates the capital debt repayment margin and replacement margin for the

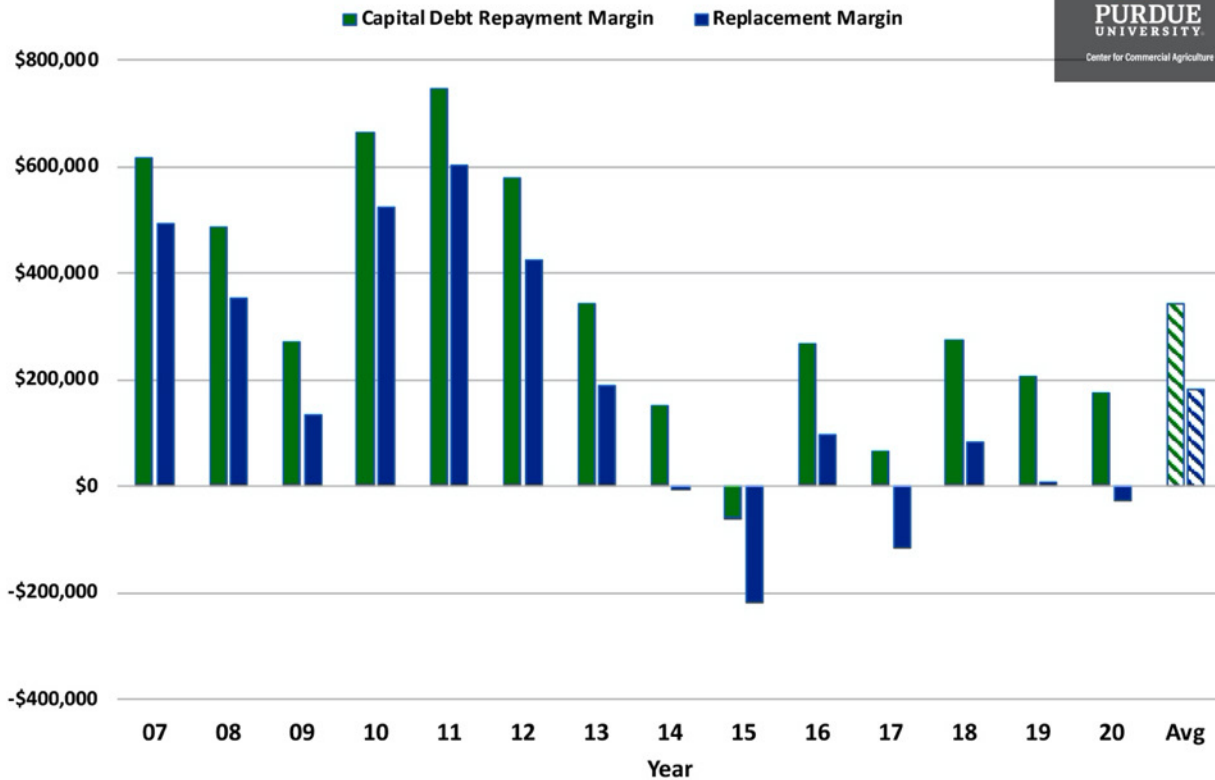
case farm since 2007. Though both of these measures appear to be relatively low in 2019, the long-run averages (2007 to 2020) are positive indicating the case farm has been able to repay debt, replace assets, and expand since 2007.

Length of Repayment Period and Interest Rate

The longer the repayment period and the lower

the rate of interest, the greater the debt that can be carried by any level of funds available for loan repayment. It is important to compare the life of an asset to the length of the loan used to help finance the asset. If the loan length is substantially less than the life of the asset, repayment capacity diminishes. The case farm has a ten-year note on machinery and a thirty-year note on land. These loan lengths make it easier for the case farm to repay noncurrent loans.

**Figure 1. Capital Debt Repayment Margin and Replacement Margin
White County Farms**



Stability of Income

Income risk varies widely between farms and enterprises. Price, weather, and disease all impact risk levels. When heavy debt loads are necessary, a farm should reduce risks as much as possible. The greater the weather or price risk for the farm’s enterprises, the more conservative the amount of loans should be. Where crop and livestock insurance can be used to reduce risk, its use should be considered. Also, the greater the risk, the greater the importance of doing things right. When everything is done well and on time, prospects for success are greatly improved, and risk is reduced.

Effect of Skill and Experience

The value of each operator’s skill and experience is important. Superior performance resulting from excellent management may be the most important factor influencing debt carrying capacity. Superior management will cause income prospects to improve and reduce the possibility of losses.

Age and Health of Operators

These factors are, of course, relative ones. Younger, more ambitious operators, who also have the advantage of good health, can expect to meet relatively heavy debt repayment demands compared to anyone

lacking in health and vigor. Young operators are often relatively more interested in expansion. When an operation is aggressively expanding, it is imperative to gauge the impact of this expansion on the farm's liquidity, solvency, and repayment capacity positions.

Risk Aversion

Debt is one of the largest sources of risk (i.e., volatility of income). For this reason, among others of course, operators that are averse to risk tend to have lower debt-to-asset ratios. These lower debt-to-asset ratios often reduce the rate of expansion. However, they also may reduce the probability of large losses and the anxiety often associated with high debt levels.

Concluding Comments

There are numerous factors impacting a farm's debt holding capacity. It is important to remember that financial leverage or debt directly impacts a farm's growth rate through its effect on expected returns

and risk (Langemeier and Boehlje, 2018). As long as a farm's return on assets is larger than the interest rate on borrowed funds, financial leverage will increase the return on equity and the sustainable growth rate. However, financial leverage also increases risk. For this reason, a farm needs to weigh the benefits (in the form of higher returns and farm growth) and the costs (in the form of higher interest costs and increased risk) of financial leverage or debt.

Citations:

Center for Farm Financial Management, University of Minnesota, [FINBIN web site](#), accessed September 8, 2020.

Langemeier, M. "[Measuring Repayment Capacity and Farm Growth Potential](#)." Center for Commercial Agriculture, Purdue University, March 2019.

Langemeier, M. and M. Boehlje. "[What is My Sustainable Growth Rate?](#)" Center for Commercial Agriculture, Purdue University, May 2018.

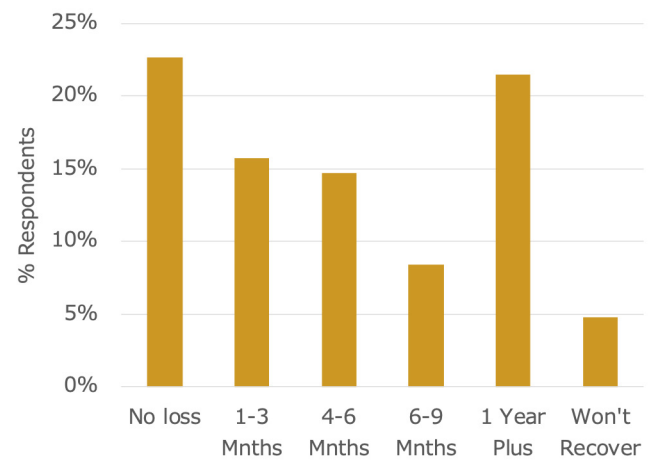
Small Business Cashflow Problems and Strategies during the COVID-19 Pandemic

Maria I. Marshall

We know that many small businesses are struggling due to the coronavirus pandemic. PIFB conducted a small business survey in July, during what we can now see was an ebb in the toll the pandemic has taken on families and businesses to date. Our sample consisted of 463 small businesses nationwide with less than 100 employees. As shown in figure 1, only 23% of business stated that they had suffered no losses. In contrast, 5% stated they would not recover and 22% stated it would take them a year or more to recover.

Part of being able to withstand and recover from a crisis or disaster is the ability to withstand cashflow problems. The majority (73%) of small businesses in our sample had cashflow problems during the pandemic. This is not an indication that the businesses were not successful before the pandemic, as 87% of the business owners indicated that their businesses were successful or very successful. Cashflow problems were to be expected as

Figure 1. How long will it take your business to recover?
Source: Purdue SBO Survey

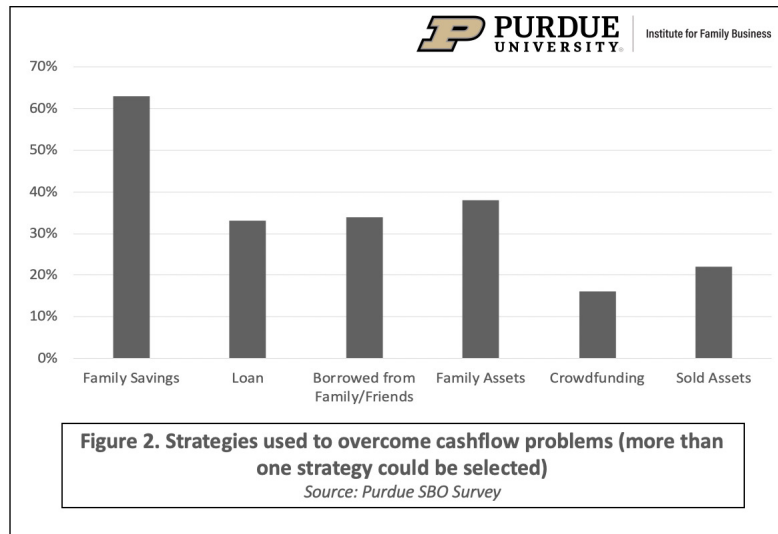


73% of our sample were also direct-to-consumer businesses.

What is interesting are the myriad of ways that small business owners used to overcome this problem. Using assistance from the CARES Act, 30% applied for paycheck protection program (PPP) loans and 18% applied for economic injury disaster loans (EIDL). As figure 2 demonstrates, business owners used a variety of strategies to overcome their cashflow problems.

A majority of businesses (63%) used family savings and 38% used family assets. Some used social networks such as borrowing from family and friends (34%) or crowdfunding (34%) or sold assets (22%).

As we have seen during other disasters, comingling between the family and the business is a survival tactic that increases the chances of survival for small businesses. However, too much comingling and relying too heavily on the family for business survival does not lead to long-term recovery.



Measuring Farm Profitability

Michael Langmeier

Farm profitability can be measured using earnings before interest, taxes, and amortization (EBITA), net farm income, operating profit margin ratio, rate of return on farm assets, and rate of return on farm equity. EBITA, as the name implies, is used to cover interest, taxes, and amortization, which includes depreciation on machinery and buildings. Net farm income is used for family living, to repay debt, and to purchase new and used assets. Though these two measures are extremely important to monitor over time on a particular farm, due to the fact that these measures depend on farm size, it seldom makes sense to compare EBITA and net farm income with other farms. Because they consider farm size, the profitability measures other than EBITA and net farm income are more useful when making comparisons among farms. The rates of return on assets and equity are extremely useful when comparing farm investments with other investments. However, these two measures are sensitive to how farm assets are valued on the balance sheet. For this reason, the operating profit margin is more conducive for benchmarking profitability among farms. In this article, a case farm in west central Indiana is used to examine operating profit margin benchmarks.

The operating profit margin ratio is computed by adding interest expense and subtracting operator and family labor from net farm income, and dividing the result by value of farm production. Net farm income, interest expense, and value of farm production can be obtained from the farm's income statement. A discussion of an accrual income statement can be found ([here](#)). Operator and family labor can be estimated using family living expenditures. At first glance, it seems odd to add interest expense and subtract operator and family labor from net farm income. There are important reasons for making these two adjustments. Including interest expense in the computation of the operating profit margin ratio makes it easier to compare farms with very little debt to farms with high debt to asset ratios. Net farm income plus interest expense can be thought of as a return to equity and debt used in the business. Including operator and family labor in the computation enables us to compare farms that rely solely on operator and family labor to those for which hired labor is a major proportion of the labor used on the farm. Unlike operator and family labor, hired labor is an expense reported on an income statement. Subtracting operator and family labor from net farm income in the computation of the operating

profit margin ratio ensures that both hired labor and operator and family labor are incorporated into our benchmarks.



Table 1. Operating Profit Margin Ratio for a West Central Indiana Case Farm.

	2015-2019 Average	Projected 2020	Projected 2021
Net Farm Income	114,751	64,378	40,460
Interest Expense	84,799	88,713	90,336
Operator and Family Labor	83,900	85,000	85,000
Value of Farm Production	1,924,809	1,912,734	1,884,735
Operating Profit Margin Ratio	0.060	0.036	0.024

Table 1 (above) presents the computation of the operating profit margin ratio for a west central Indiana case farm. The case farm has 3000 acres of corn and soybeans. Of the 3000 acres operated by the farm, 2250 acres are cash rented from several landlords and 750 acres are owned. The columns in table 1 compare the projections for 2020 and 2021 with the five-year average ratio for the 2015 to 2019 period. Using stoplight terminology, the “green” region for the operating profit margin ratio is 20 percent and above, the “yellow” region applies to a ratio between 10 and 20 percent, and the “red” region applies to a ratio below 10 percent. These benchmarks apply to long-run performance, not individual years. Notice that the performance for this case farm was considerably below the 20 percent benchmark during the last several years.

To further evaluate the performance of the case farm,

we can compare the farm’s profit margin from 2015 to 2019 to data obtained from the Illinois Farm Business and Farm Management (FBFM) Association and the Center for Farm Financial Management (FINBIN database). The median operating profit margin from these two sources for the most recent five-year period for which data are available was from 5 to 6 percent. Using this information, the case farm’s performance during the time period was average.

This article discussed the measurement of farm profitability. Using a case farm, the computation of the operating profit margin ratio was illustrated and discussed. The historical profit margin for the case farm is similar to that experienced by other farms during the 2015 to 2019 period. The operating profit margins projections for 2020 and 2021 at 3.6 and 2.4 percent, respectively, are relatively low, even compared to the most recent five-year period.

Special Financial Edition

We hope that you enjoyed reading our special edition on finances. There is no doubt that the recent COVID pandemic has put a financial squeeze on many families and on many businesses. For more information on personal financial planning and farm finances, you can visit the [Purdue Institute for Family Business website](#) and the [Center for Commercial Ag website](#).



The PIFB team of Maria Marshall and Renee Wiatt have filmed videos to kick off the *Family Business Video Series*. The first two videos in the series are linked below. Continue to stay engaged with our Institute and our [YouTube Channel](#) as we release more videos.

- What is a Family Business?

This video will explain how to define a family business, how families influence firms, and the amount of control that families can have in their businesses. Also, the three systems of ownership, family and business and their intersection is explained.

- Social Structure of the Family

This video dives into the social structure of the family business, including family of orientation and family of procreation. The structure of the family can ultimately affect how the business is run, passed down to the next generation, and how decisions are made.

Meet PIFB & Newsletter Contributors

Maria Marshall

PIFB Director, NCRCRD Director, and Professor

Purdue University: Department of Agricultural Economics

mimarsha@purdue.edu

Renee Wiatt

PIFB Family Business Management Specialist

Purdue University: Department of Agricultural Economics

renewiatt@purdue.edu

Yoon Lee

Professor

Utah State University: Department of Human Development and Family Studies

Virginia S. Zuiker

Associate Professor

University of Minnesota: Department of Family Social Science

Michael Langmeier

Associate Director of the Center for Commercial Agriculture and Professor

Purdue University: Department of Agricultural Economics

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